Directive N0. 1034/2024

Directive Issued to Determine Electric Vehicle Charging System (EVCS)

No. 1034/2024

Whereas it is necessary to establish directive for electric vehicle charging system;

Now, therefore, the Petroleum and Energy Authority, in accordance with the power conferred to it under article 40(2) of the Energy Proclamation No. 810/2013 and Article 82 of the Council of Ministers Energy Regulation No. 447/2019 issues this directive.

PART ONE
GENERAL

1. Short Title

This Directive may be cited as the **"Electric Vehicle Charging System (EVCS) Directive No. 1034/2024."**

2. Definitions

In this Directive unless the context otherwise requires;

1/ The definitions provided in the Energy Proclamation No 810/2013, Energy Regulation No. 447/2019 and Council of Ministers Regulation No. 521/2022 shall also apply to this Directive.

2/ "**Proclamation"** means the Energy Proclamation No 810/2013.

3/ **"Regulation"** means the Energy Regulation No 447/2019.

4/ "**Authority**" means Petroleum and Energy Authority.

5/ "**Electric Vehicle (EV)**" means any vehicle propelled by an electric motor drawing current from a rechargeable battery (i.e. energy storage system), intended primarily for use on public streets, roads, or highways etc.

6/ "**Electric Vehicle Charging System**" means complete system including the **EV** supply equipment and the EV functions that are required to supply electric energy to an **EV** for the purpose of charging.

7/ **"Facilities"** all real property (including all buildings, fixtures or other improvements located thereon), leased, operated, or used by company or any of its subsidiaries or any of their respective predecessors or affiliates.

8/ "**Charging speed**" means, charging power, which determines the time, required charging a vehicle, and it can vary by orders of magnitude across charge points.

9/ "**Fast charging**" means rapid charging or quick charging to recharge EV batteries within a short period of time.

10/ **"AC Slow charging"** means charging with home private charging system with singe phase 230/380V can be either mode 1 or mode 2.

11/ **"DC Fast charging" means** DC current is sent to the electric car's battery directly via the charge port.

12/ **"At Home EV Charging"** means an EV charging where owner of an electric vehicle can charge his own vehicle by installing a charger in his house.

13/ **"Public EV charging Services (PCS)"** means an EV charging station where any electric vehicle can get its battery charged.

14/ "**Captive charging Services (CpCS)"** means an electric vehicle charging station exclusively for the electric vehicles owned or under the control of the owner of the charging station e.g. Government offices, corporate houses, bus depots, charging stations owned by the fleet owners etc. and shall not be used for commercial purpose of charging other vehicles on paid basis.

15/ "**Charging types**" means that refers to the shape and design of the plug that connects the charger to the vehicle.

16/ "**Charging levels" means** the maximum power output of the charger, which affects the charging speed and range.

17/ "**Charging Modes"** means that how the charger communicates with the charging point and the vehicle.

18/ Any expression in the masculine gender includes the feminine.

3. Scope of the Directive

1/ This directive shall apply to any person/company who provides or utilizes any EVCS in Ethiopia, irrespective of the source of its electricity supply, whether from the national grid or off-grid systems, and;

2/ It shall apply to those who provide electricity supply to EVCS service providers.

4. Objectives of the Directive

1/ To enable faster adoption of Electric vehicles in Ethiopia by ensuring safe, reliable, accessible, and affordable charging infrastructure.

2/ To prescribe minimum licensing requirements for those who wish to engage in EVCS business.

3/ To determine approach to set reasonable electricity tariff for charging station owners and electric vehicle owners, and set the tariff for off-grid systems as per directive issued by the authority.

4/ To generate income opportunities for entrepreneurs.

5/ To prescribe minimum standards and specifications in installation and operation.

6/ To encourage the use of alternative renewable electricity sources and to make our country Ethiopia contribute to climate change and reducing atmospheric temperature or carbon emissions.

PART TWO
ELECTRIC VEHICLE CHARGING SERVICES

5. EV charging services

1/ Possible EV charging services are:

a) At home EV charging.

b) Public EV charging Station (PCS) services

c) Captive charging Station (CpCS) Services

2/ EV charging modes shall be as explained in the four different modes of electric vehicle conductive charging specified in the IEC 61851 or to be specified in IES.

a) **Mode 1**: This is the slowest and simplest mode, using a standard household plug and socket. It does not support any communication or safety features between the EV and the charger. It can deliver up to 16 A and 250 V single-phase or 480 V three-phase. It takes around 8 -12 hours to fully charge an EV with this mode.

b) **Mode 2**: This is like **Mode 1**, but with a special cable that has an in-cable control and protection device (IC-CPD) to prevent overheating and electric shocks. It can deliver up to 32 A and 250 V single-phase or 480 V three-phase. It is also slow mode, but more convenient and safer than **Mode 1**.

c) **Mode 3**: This is a semi-fast mode that uses a dedicated wall box or charging station that communicates with the EV and adjusts the current and voltage accordingly. It can deliver up to 40 A and 250 V single-phase or 480 V

three-phase. It is a popular mode for home and public charging, as it offers faster and more reliable charging than **Mode 1** and **2**.

d) **Mode 4**: This is the fastest mode, using a Direct Current (DC) charging station that bypasses the EV's on-board charger and directly charges the battery. It can deliver up to 400 A and 1000 V Direct Current (DC). It is mainly used for public charging, as it can provide 80% charge in less than 30 minutes.

6. Right and Obligations of EV Charging Service Provider

1/ Any licensed EV charging Service Provider shall have the following rights:

a) To establish a charging station that meets the standards, technical and safety requirements set forth in this directive.

b) To generate electricity or can have its own electricity generation facility to provide EV charging services;

c) To obtain electricity supply from a licensed power producer or from distribution and sales licensees;

d) Licensed Public EV charging service Provider has the right to charge a service fee for charging electric vehicles.

2/ Any licensed EV charging Service Provider shall have the following Obligations:

a) Register their EV charging stations and networks with the relevant authorities;

b) Report any accidents involving their EV charging stations to the authorities and the EV users.

c) Not to discriminate or restrict access to their EV charging stations or networks based on the EV model, brand, or ownership.

d) Comply with technical, safety and Operational standards and requirements issued by the authority;

e) offer fair and transparent pricing and billing for their charging services;

f) provide accessible and convenient space, lighting and safety conditions for electric vehicles;

g) Repair or replace promptly by a competent professional in the event of breakdown or damage.

h) Install EV chargers and related electrical works by competent professional with proper competency certification.

i) Comply with relevant regulations related to electrical safety, fire safety, environmental protection and accessibility;

7. Electric vehicle owner's rights and obligations

1/ Electric Vehicle Owner shall have the following rights:

a) Set up charging station and charge his own electric vehicles at their residence or office using existing electricity connections;

b) To generate electricity (to be licensed) to charge his vehicle;

c) Obtain charging service from any public electric vehicle charging station;

d) Get reasonable compensation for any damage caused to his vehicle and its equipment due to substandard charging services;

2/ Electric Vehicle Owner shall have the following obligations:

a) Comply with technical, safety and Operational standards and requirements issued by the authority;

b) Comply with public electric vehicle charging station guideline;

c) Pay for charging service received from public vehicle charging station.

8. Rights and Obligations of Electricity supply licensees

1/ Electricity supply licensees shall have the following rights;

a) Sell and collect revenue from licensed electricity charging service provider based on an approved electricity tariff or approved power purchase agreement;

b) Connect electricity supply systems to EV charging facilities as per provisions of the national grid code;

2/ Electricity supply licensees shall have the following obligations;

a) Provide supply to licensed EV charging service provider in accordance with service quality standards, provisions of the National grid code, Mini Grid directive and other codes approved by the authority.

b) Comply with technical, safety and Operational standards and requirements issued by the authority;

PART THREE

TECHNICAL STANDARDS

9. EV Charging Requirements

1/ Every EV Public Charging Stations (PCS) shall comply with the following requirements.

a) An exclusive transformer with all related substation equipment including safety appliances, if required by the supply Code as approved by Authority.

b) For existing parking stations, related commercial centers and malls, to install public charging stations in their existing facilities, the transformer capacity and other power supply facilities needs to be approved whether they can meet quality standards.

c) 33/15kV line/cables with associated equipment including as needed for line termination/metering etc. as approved in supply code.

d) Appropriate cabling and Electrical works ensuring safety.

e) Adequate space for charging and entry and exit of vehicles.

f) Appropriate fire protection equipment and related facilities;

g) Shall have a minimum of two ports and the chargers may be any combination of chargers from one or more electric kiosk/boards.

h) Shall comply with the provisions of Ethiopian National Distribution Grid code regarding metering, connections, and safety.

i) Certified by the responsible authority or a recognized certification body and must display the relevant certification marks or labels.

j) be compatible with the common EV charging connectors and protocols used in the region and must support interoperability and roaming among different EV charging networks and service providers.

k) Be equipped with smart meters and communication devices that can measure and transmit the energy consumption, charging status, and other relevant data of each EV charging point.

l) Must have clear and visible signage and instructions that indicate the type, availability, price, and payment method of the charging service, as well as the contact information of the EV charging service provider and the emergency services.

10. EV Charging Facilities Safety Requirements

1/ The EV charging facility Final circuit shall be;

a) Electric cable for the final circuit shall be protected by means of metal sheath or armor or installed in steel or plastic conduits.

b) Cable sizing shall be designed according to its current carrying capacity.

c) The copper conductor size of electric cable for each final circuit shall be selected based on the design current of the EVCS and considering the constraint of voltage drops in the circuit in accordance with its current carrying capacity.

d) A larger size electric cable may be used to facilitate future upgrades.

e) Cables used in final circuits shall be of continuous length and shall contain no joint.

2/ The EV charging facility Protective Device shall be;

a) Each final circuit shall be individually protected by a high breaking capacity (HBC) fuse or miniature circuit breaker (MCB) of suitable rating.

b) An earth leakage protective device shall be provided for each final circuit.

c) A current breaking device (an ON/OFF switch or others) shall be provided at the upstream of the socket outlet at the charging facility.

d) Surge protection device is recommended to be installed to protect the equipment from surges.

e) The EVCS systems must be equipped with reverse power flow protection and anti-islanding feature in the charger system unless the EV charger is designed to only allow unidirectional power flow for battery charging.

3/ The EV charging earthing system shall be;

All its exposed conductive parts of the electrical installation shall be earthed as required in distribution grid code.

4/ The EV charging Connector and Adaptor shall be;

a) Any mode of charging EV, socket outlet or vehicle connector and the associated plug used shall comply with IEC standard or national standard to be issued by Ethiopian standard institute for the mode of charging.

b) The EVCS and socket outlet and associated electrical equipment shall be suitably protected from ingress of dust and water to an index of protection of IPX4 for use at indoor car park.

c) An index of protection of IPX4 or higher is required for both plugged and non-plugged conditions if the EV charging facility is installed and used in an outdoor environment.

5/ The EV charging Extension Unit shall be;

No extension and multi adaptor unit other than charging cable assembly designed for EV charging shall be used.

6/ The EV charging Type Test Certificate;

a) EVCS shall be type tested for compliance with the relevant IEC.
b) In case, EVCS is designed for outdoor use, test certificate for ingress protection rating in accordance with IEC 60529.
c) The EVCS suppliers shall be obliged to provide such test certificates.

7/ The EVCS installation Requirement at Commercial and Public Access: PCS

a) Detailed planning is required to place the EV parking and charging area correctly under consideration of current and possible future requirements.
b) The public charging locations should be focused on sites where the owners of the EV can conveniently park their vehicles for a significant amount of time.
c) Among suggested locations for the above matter are somewhere near public facilities and entertainments such as near the shop lots, malls, restaurants, public parks, sports arenas, and others.

11. Technical Standards of Public charging stations and Captive power stations

1/ Current international standards that are prevalent and used by most vehicle manufacturers internationally are combined charging System (CCS) and CHadeMO may be used.

2/ Public charging stations shall have, one or more electric kiosk/boards with installations of all the charger models as of Annex 1:

3/ In addition to those specified under this article sub / 2/ Annex 1, any other fast/slow/moderate charger as per issued by Institute of Ethiopian Standard (IES) standards shall be used whenever notified.

12. Public Charging Infrastructure (PCI) for long range EVs and/or Heavy duty EVs

Fast Charging Stations (FCS) i.e. public charging stations for long range EVs and/or heavy duty EVs (like trucks, buses etc.) will have the following:-

1/ At least two chargers of minimum 100kW (250 – 750V or higher) each of different specification (CCS and CHAdMO) and with single connector gun each.

2/ Appropriate liquid cooled cables for high-speed charging facility for onboard charging of fluid cooled batteries.

13. Location of Public Charging Stations

1/ In case of public charging stations, the following minimum requirements are laid down regarding density/distance between two charging points:

a) One charging station shall be set up at every 50km on both sides of highways/roads.

b) For long EVs and heavy duty EVs like buses/trucks etc., there should be at least one fast charging station at every 120km, one on each side of the highways/road located preferably within/alongside the stations.

2/ Additional public charging stations shall be set up in any area only after meeting the above requirements.

3/ Any deviation from the above norms shall be admissible only after specific reason to be justified by the Authority is approved after application is submitted.

14. Power Quality

The EVCS operation shall not contribute to poor power quality conditions to the Distributor's/utility's electricity supply it is connected to

15. Metering

1/ Electricity service meter shall be located at the final customer connection point.

2/ It shall meter the energy consumption (kWh) and Peak demand (kW) in a period.

3/ Measurements can be collected by time-of-use, in peak and off-peak hours for instance.

4/ Smart meters can collect hourly measurements and included bi-directional communication with Distribution System Operator (DSO).

16. Installation and Operation Procedure of Public Charging Stations

The charging service owner shall have its own installation, operation and maintenance guideline that comply with guideline to be developed by the Authority for these purposes.

PART FOUR
LICENSE

17. License Type and Classes

1/ Both public charging services (PCS) and Captive Charging Station (CpCS) services shall be licensed.

2/ License Types

a) EV Charging service License for PCS station;

b) Captive Charging Station (CpCS) license

3/ License class

a) Class I: Less than or equal to 100 kW of Charging Capacity

b) Class II: Greater than 100KW charging capacity.

4/ All the above Licenses are site-specific:

6/ A separate License shall be obtained for each activity

18. Application and Issuance of License

Any application for a license for charging service shall be lodged to the authority by filling the form prepared by the Authority for this purpose and accompanied with the following information of the applicant:

1/ Identification card and address of the applicant.

2/ Documents showing the applicant's financial capacity and situation.

3/ Technical competency and experience of the applicant.

4/ Professional competency of the proposed professionals for electrical works.

5/ Trade registration certificate; taxpayers identification number

6/ Application examination fee receipt

19. Specific Requirements for Public charging service License Application

Any EV public charging services for a license shall, in addition to general requirements stated under Article 18 of this directive, contain the following:

1/ Initially when submitting application for license.

a) Source of electricity supply for intended charging services.

b) Map of the project site.

c) Total capacity of the charging services in kW/kVA/

d) Feasibility study of the project.

e) Distribution network/grid details to which it shall be connected or whether it operates on an off-grid business.

f) Proposed term of the license.

g) Other documents which the licensing authority believes to be necessary and relevant.

2/ In addition to the requirements stated under sub-article /1/ of this Article, the following requirements shall be fulfilled before commencement of the licensed charging services.

a) An operation instruction for the charging facility including essential information

b) Approved power purchase agreement; when appropriate.

c) Project finance agreement,

d) Environmental impact assessment clearance certificate from the relevant authority.

e) Land use permit.

f) Other primary energy resource development license and others;

20. <u>License terms and renewal</u>

1/ EV charging service license be valid for 2 years;

2/ The license shall be renewed by applying to the authority 3 months before the end of the renewal period.

21. Suspension and Revocation of license

1/ A license may be suspended on one of the following grounds;

a) Fail to comply with obligations under article 6(2) of this directive and did not take corrective action within the given correction period.
b) Engage in activities beyond the license scope issued by the authority;
c) Transfer his/her license to a third party without the consent of the authority;
d) Cause damage on life or property of the service user as a result of basic safety and quality problem;
e) Intentionally obstruct or create obstacle in the regulatory activity of the authority;

2/ The authority shall, at least 30 days ahead, issue a written notice to the licensee by stating the grounds on which suspension measure is to be taken;

3/ A license may be revoked accordance with sub-article (2) of this article, if the person fails to rectify the problem entailed suspension within the period given to rectify it, commits another problems for the second time within a year which may entail suspension.

4/ Any person whose license is suspended or revoked may apply to the authority within one month for review of the decision by the authority.

5/ The authority should respond within two weeks to the written application submitted under sub-article (4) of this article.

PART FIVE
ELECTRICITY SUPPLY AND RELATED TARIFF

22. Tariff for Supply of Electricity to EV Public Charging Stations

1/ The tariff for supply of electricity to EV public charging stations/or captive stations from off-grid systems shall be determined by the Authority; as per issued off-grid tariff determination guideline.

2/ The current tariff for supply of electricity to EV public charging stations or captive charging stations from the national grid shall be the same as the general tariff category unless a new tariff category is approved by the Authority as may be necessary.

3/ The distribution utilities or licensees may submit a new tariff proposal to the Authority.

4/ The tariff applicable for domestic consumption shall be applicable for domestic charging.

5/ The tariff/cost of charging a vehicle by EV public charging stations is market based.

PART SIX
MISCELLANEOUS PROVISION

23. Administrative Penalty

The Authority may impose administrative penalty on the service provider of EVCS, as per Sub-article /3/ of Article 76 of the Energy Regulations for non-compliance of the provisions of this directive based on the gravity of the fault.

24. Transitional Provisions

The EV charging service providers entered the business of EV charging before the coming into force of this directive shall be licensed within 6 months, and their electricity supply tariff may undergo revision subject to good cause presented to the authority.

25. Effective Date

This Directive shall come into force as of the date it was registered by the ministry of justice.

SEHARLA ABDULAHI
DIRECTOR GENERAL
PETROLEUM AND ENERGY AUTHORITY